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INVISIBLE TECHNOLOGY

To live responsibly, we need to open our eyes to the forces of technology surrounding us

PAMELA ZURER

Last fall, Rep. Rush Holt (D-N.J.) sat down to learn something about genetic sequencing. Capitol Hill was in an uproar over the anthrax-contaminated letters that had sickened postal workers and shut down the Hart Senate Office Building. And Holt had found that none of the hundreds of strains of pathogens that could be used in bioterrorism had been sequenced.

"The topic certainly wasn't part of my training as a physicist," Holt told a symposium on technological literacy held last month at the National Academies, Washington, D.C. "I'm as willing to learn about genetic sequencing, however, as I am to learn about the budget process. But others in Congress are not. 'That's for the scientists,' they say. I hope they will become more comfortable with the science and technology surrounding us and realize it's not another world, it is indeed their world."

The attitude Holt has encountered--that the facility to deal with questions of science and technology is limited to the members of an exclusive club--was all too familiar to his audience. They had gathered for the unveiling of

"Technically Speaking: Why All Americans Need To Know More About Technology," a report by the National Academy of Engineering and the National Research Council (C&EN, Jan. 21, page 29).

"What is technological literacy?" asked Jonathan R. Cole, Columbia University's provost and a member of the committee that put the report together. "It involves not only knowing something about the nature and history of technology, but also having certain capabilities and critical-thinking skills regarding its development and use. And we believe that the nation's education and policy-making systems have done far too little to recognize the importance of this broader view."

As a Gallup poll released the same day made clear, most of us equate technological literacy with being able to surf the Web or program our DVD players. But technology and its societal ramifications pervade our lives, as recent newspaper headlines attest:

- X-Ray Vision in Hindsight: Science, Politics, and the Mammogram
- Copy Cat Is First Cloned Pet
- Bush Unveils Global Warming Plan
- DNA Testing in Rape Case Frees Prisoner after 15 Years
- Energy Department Recommends Yucca Mountain for Nuclear Waste Burial

We are so immersed in technology these days that we don't recognize it.

"Technology is everywhere, and so it is nowhere," noted Goéry Delacôte, executive director of the Exploratorium in San Francisco and a committee member. But that blindness could prove costly.

"If we cannot think critically about the costs and benefits of technological changes and innovations, about the development of new technology, and if we have only limited knowledge about and limited conceptual skills and capabilities in using technology, we are apt to make uninformed and poor choices," Cole said. "As individuals, parents, citizens, and leaders, we will substitute myth and ideology for facts and rational choice."

The report calls for a broad-based effort to increase technological literacy. Most important, it says that the connections among all subjects and technology should be infused throughout a student's education. "Schools need to move beyond the perception of technology as a separate subject to be taught in shop class," Cole said. The National Science Foundation and the Department of Education should encourage publishers to include technological content in science, history, social studies, and English textbooks. And decisionmakers must recognize that all technologies involve trade-offs and may result in

unintended consequences.

Then, maybe, we'll be better prepared to decide whether to buy genetically modified foods, whether to type in our credit card numbers at an e-business website, or how often to schedule a mammogram.

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GALLUP POLL

Americans Value Tech Literacy

Nearly all of 1,000 Americans surveyed last spring think it's important for people to have the ability to understand and use technology. The [International Technology Education Association](#) commissioned the Gallup Poll to shed light on U.S. citizens' attitudes toward and knowledge of technology.

The [survey revealed](#) a consensus that schools should include the study of technology as a mandatory part of the curriculum. But most Americans think the word technology denotes "computers and the Internet," rather than the broader definition of "changing the natural world to satisfy our needs," the poll found. Men feel more confident than women that they could explain common technologies. Most respondents correctly understand their cars, microwaves, and cell phones. But they incorrectly associate FM radios with static.

Could you explain each of the following to a friend?

	YES RESPONSE	
	MEN	**WOMEN**
How a flashlight works.	96%	83%
How to use a credit card to get money out of an ATM.	92	86
How a home heating system works.	76	54
How a telephone call gets from point A to point B.	86	55
How energy is transferred into electrical power.	72	36

Tell me if each of the following statements is true or false.

	TRUE	FALSE
Using a portable phone while in the bathtub creates the possibility of being electrocuted.	46%	51%
FM radios operate free of static.	26	72
A car operates through a series of explosions in the engine.	82	15
A microwave heats from the outside to the inside.	37	62

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